

AMENDMENTS TO THE CLAIMS

1-25. (Canceled)

26. (Previously presented) An imager, comprising:

a semiconductor substrate;

an array of photosensitive sites located on the substrate, the array including

a plurality of first photosensitive sites having a plurality of first color filters arranged above said first photosensitive sites to allow only a first spectral component of light to reach said first photosensitive sites, wherein each first photosensitive site comprises a configuration enabling each first photosensitive site to measure the level of a first spectral component in light received by the respective first photosensitive site, and

a plurality of second photosensitive sites having a plurality of second color filters arranged above said second photosensitive sites to allow only a second spectral component of light to reach said second photosensitive sites, wherein each second photosensitive site comprises a configuration enabling each second photosensitive site to measure the level of a second spectral component in light received by the respective second site, said second spectral component being different from said first spectral component; and

an interpolator located on the substrate and comprising a configuration enabling the interpolator to estimate the level of the first spectral component in the light received by at least one of the second photosensitive sites based on at least one measurement of the first spectral component obtained respectively by at least one of the first photosensitive sites.

27. (Previously Presented) The imager according to claim 26, wherein the first spectral component is a primary color of light.

28. (Previously presented) The imager according to claim 26, wherein

each second photosensitive site comprises a configuration enabling each second photosensitive site to measure the level of a second spectral component in light received by the respective second photosensitive site, and

the interpolator further comprises a configuration enabling the interpolator to estimate the level of the second spectral component in the light received by at least one of the first photosensitive sites based on at least one measurement of the second spectral component obtained respectively by at least one of the second photosensitive sites.

29. (Canceled)

30. (Previously presented) The imager according to claim 28, wherein the array further comprises a plurality of third photosensitive sites, and

the interpolator further comprises a configuration enabling the interpolator to estimate the level of the first spectral component in the light received by at least one of the third photosensitive sites based on at least one measurement of the first spectral component obtained respectively by at least one of the first photosensitive sites, and to estimate the level of the second spectral component in the light received by at least one of the third photosensitive sites based on at least one measurement of the second spectral component obtained respectively by at least one of the second photosensitive sites.

31. (Previously presented) The imager according to claim 30, wherein

each third photosensitive site has a plurality of third color filters arranged above said third photosensitive sites to allow only a third spectral component of light to reach said third photosensitive sites, and wherein each third photosensitive site comprises a configuration enabling each third photosensitive site to measure the level of a third spectral component in light received by the respective third photosensitive site, and

the interpolator further comprises a configuration enabling the interpolator to estimate the level of the third spectral component in the light received by at least one of the first photosensitive sites and/or at least one of the second photosensitive sites based on at least one measurement of the third spectral component obtained respectively by at least one of the third photosensitive sites.

32. (Previously Presented) The imager according to claim 31, wherein
- the first spectral component is a first primary color of light,
- the second spectral component is a second primary color of light, and
- the third spectral component is a third primary color of light.

33. (Previously presented) The imager according to claim 31, further comprising:
- a line decoder located on the substrate and having at least one serial output for transferring out at least one line of measured spectral components from the array during a read out operation;
- and

an A/D conversion element located on the substrate and comprising a configuration enabling the A/D conversion element to receive the at least one line of measured spectral components read out from the line decoder and output the received measurements as digital values to the interpolator, and

wherein the interpolator estimates the first spectral component levels in the second and third photosensitive sites, the second spectral component levels in the first and third photosensitive sites, and the third spectral component level in the first and second photosensitive sites based on the digital values received from the A/D conversion element.

34. (Previously presented) The imager according to claim 26, further comprising:

a line decoder located on the substrate and having at least one serial output for transferring out at least one line of measured spectral components from the array during a read out operation; and

an A/D conversion element located on the substrate and comprising a configuration enabling the A/D conversion element to receive the at least one line of measured spectral components read out from the line decoder and output the received measurements as digital values to the interpolator, and

wherein the interpolator estimates the first spectral component levels in the second photosensitive sites based on the digital values received from the A/D conversion element.

35. (Previously Presented) The imager according to claim 26, further comprising a line decoder located on the substrate and having at least one serial output for transferring out at least one line of measured spectral components from the array during a read out operation, wherein the at least one serial output of the line decoder transfers out either several sequential lines or a block of measured spectral components from the array during each read out operation.

36. (Canceled)

37. (Previously presented) An imager, comprising:

a semiconductor substrate;

a plurality of first photosensitive sites located on the substrate, said plurality of first photosensitive sites having a plurality of first color filters arranged above said first photosensitive sites to allow only a first spectral component of light to reach said first photosensitive sites, wherein each first photosensitive site comprises a configuration enabling each first photosensitive site to measure the level of a first spectral component in light received by the respective first photosensitive site;

a plurality of second photosensitive sites located on the substrate, said plurality of second photosensitive sites having a plurality of second color filters arranged above said second photosensitive sites to allow only a second spectral component of light to reach said second photosensitive sites, wherein each second photosensitive site comprises a configuration enabling each second photosensitive site to measure the level of a second spectral component in light received by the respective second photosensitive site, said second spectral component being different from said first spectral component; and

an interpolator located on the substrate and comprising a configuration enabling the interpolator to receive digital data representing the spectral component levels measured in the first photosensitive sites and the second photosensitive sites, and to estimate the level of the first spectral component in the light received by at least one of the second photosensitive sites based on at least one digitized measurement of the first spectral component obtained respectively by at least one of the first photosensitive sites.

38. (Previously presented) The imager according to claim 37, further comprising a plurality of third photosensitive sites, said plurality of third photosensitive sites having a plurality of third color filters arranged above said third photosensitive sites to allow only a third spectral component of light to reach said third photosensitive sites, wherein each third photosensitive site comprises a configuration enabling each third photosensitive site to measure the level of a third spectral component in light received by the respective third photosensitive site, and wherein the interpolator further comprises a configuration enabling the interpolator to estimate:

the level of the first spectral component in the light received by at least one of the third photosensitive sites based on at least one digitized measurement of the first spectral component obtained respectively by at least one of the first photosensitive sites,

the level of the second spectral component in the light received by at least one of the third photosensitive sites based on at least one digitized measurement of the second spectral component obtained respectively by at least one of the second photosensitive sites, and

the level of the third spectral component in the light received by at least one of the first photosensitive sites and/or at least one of the second photosensitive sites based on at least one digitized measurement of the third spectral component obtained respectively by at least one of the third photosensitive sites.

39. (Canceled)

40. (Previously presented) The imager according to claim 38, wherein
the first spectral component is a first primary color of light,
the second spectral component is a second primary color of light, and
the third spectral component is a third primary color of light.

41. (Previously Presented) The imager according to claim 40, wherein the interpolator output a twenty four bits of color data for each photosensitive site, with each color value being represented by eight bits.

42. (Previously presented) The imager according to claim 38, wherein the interpolator includes at least one serial register for storing digital bit values representing the spectral component measurements from a photosensitive site being interpolated and the photosensitive sites neighboring the photosensitive site being interpolated.

43. (Previously presented) The imager according to claim 42, wherein, for estimating a spectral component level for a photosensitive site, the interpolator digitally weights the values of the spectral component being estimated, as measured by the photosensitive sites providing the measurements and which are currently stored in the at least one serial register, based on the

distances of the photosensitive sites providing the measurements from the photosensitive site for which the spectral component is being estimated.

44. (Previously presented) An imaging device, comprising:

a display for displaying an image on an array of $M \times N$ pixels; and

an imager which comprises

a substrate,

an $M \times N$ array of photosensitive sites located on the substrate, the array including

a plurality of first photosensitive sites located on the substrate, said plurality of first photosensitive sites having a plurality of first color filters arranged above said first photosensitive sites to allow only a first spectral component of light to reach said first photosensitive sites, wherein each first photosensitive site comprises a configuration enabling each first photosensitive site to measure the level of a first color component in light received by the respective first photosensitive site, and

a plurality of second photosensitive sites located on the substrate, said plurality of second photosensitive sites having a plurality of second color filters arranged above said second photosensitive sites to allow only a second spectral component of light to reach said second photosensitive sites, wherein each second photosensitive site comprises a configuration enabling each second photosensitive site to measure the level of a second color component in light received by the respective second photosensitive site, said second color component being different from said first color component; and

an interpolator located on the substrate and comprising a configuration enabling the interpolator to receive digitized color component values corresponding to the measurements obtained in the first and second photosensitive sites, to estimate the level of the first color component in the light received by at least one of the second photosensitive sites based on at least one digitized color component obtained respectively from at least one of the first photosensitive sites, and to estimate the level of the second color component in the light received by at least one of

the first photosensitive sites based on at least one digitized color component obtained respectively from at least one of the second photosensitive sites.

45. (Previously Presented) The imaging device according to claim 44, wherein the interpolator estimates the color component level not measured in each respective photosensitive site in at least one line of photosensitive sites in the array during a readout operation.

46. (Previously Presented) The imaging device according to claim 45, wherein the interpolator estimates the color component level not measured in each respective photosensitive site in several sequential lines of photosensitive sites in the array during a readout operation.

47. (Previously presented) The imaging device according to claim 45, wherein the interpolator estimates the color component level not measured in each respective photosensitive site in a block of photosensitive sites in the array during a readout operation.

48. (Previously presented) The imaging device according to claim 44, wherein the M x N array further includes a plurality of third photosensitive sites, said plurality of third photosensitive sites having a plurality of third color filters arranged above said third photosensitive sites to allow only a third spectral component of light to reach said third photosensitive sites, wherein each third photosensitive site comprises a configuration enabling each third photosensitive site to measure the level of a third color component in light received by the respective third photosensitive site, and

wherein the interpolator further comprises a configuration enabling the interpolator to estimate:

the level of the first color component in the light received by at least one of the third photosensitive sites based on at least one digitized color component value obtained respectively from at least one of the first photosensitive sites,

the level of the second color component in the light received by at least one of the third photosensitive sites based on at least one digitized color component value obtained respectively from at least one of the second photosensitive sites, and

the level of the third color component in the light received by at least one of the first photosensitive sites and/or at least one of the second photosensitive sites based on at least one digitized color component value obtained respectively from at least one of the third photosensitive sites.

49-56. (Canceled)

57. (Previously presented) The imager of claim 26, wherein the interpolator further comprises a configuration enabling the interpolator to estimate the level of the first spectral component in the light received by at least one of the second photosensitive sites based on a measurement of the first spectral component obtained respectively by only two of the first photosensitive sites.

58. (Previously presented) The imager of claim 26, wherein the interpolator further comprises a configuration enabling the interpolator to estimate the level of the first spectral component in the light received by at least one of the second photosensitive sites based on a measurement of the first spectral component obtained respectively by only a plurality of the first photosensitive sites.

59. (Previously presented) The imager according to claim 26, wherein the interpolator comprises at least one serial register for storing digital bit values representing the spectral component measurements from a photosensitive site being interpolated and four photosensitive sites neighboring the photosensitive site being interpolated.

60. (Currently amended) The imager according to claim 59, wherein the interpolator further comprises ~~five~~ four scalar multipliers for multiplying the digital bit values of the spectral component measurements from ~~the photosensitive site being interpolated and~~ the four photosensitive sites neighboring the photosensitive site being interpolated.

61. (Previously presented) The imager according to claim 60, wherein the interpolator further comprises a first adder for adding the digital bit value of a first of the four photosensitive sites neighboring the photosensitive site being interpolated to a second of the four photosensitive sites neighboring the photosensitive site and a second adder for adding the digital bit value of a third of the four photosensitive sites neighboring the photosensitive site being interpolated to a fourth of the four photosensitive sites neighboring the photosensitive site.

62. (Previously presented) The imager according to claim 61, wherein the interpolator further comprises a first dividing circuit for dividing in half a summation of the first and second of the four photosensitive sites neighboring the photosensitive site being interpolated and a second dividing circuit for dividing in half a summation of the third and fourth of the four photosensitive sites neighboring the photosensitive site being interpolated.

63. (New) The imager of claim 26, wherein the interpolator outputs a signal for the at least one of the second photosensitive sites that represents light received by the at least one of the second photosensitive sites associated second color filter, the signal comprising the estimated level of the first spectral component of light and the measured level of the second spectral component of light.

64. (New) The imager of claim 26, wherein the interpolator estimates the level of the first spectral component in the light received by the at least one of the second photosensitive sites based on measurements of the first spectral component obtained respectively by at least two of the first photosensitive sites located in a same row as the at least one of the second photosensitive sites.